CIRMM/NCRC

## TAKAHASHI LAB.

## [Nano-probing Technologies]

Centre for International Research on Micronano Mechatronics

http://www.spm.iis.u-tokyo.ac.jp

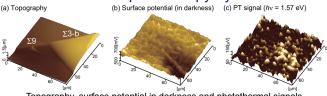
Nano-electronics

Department of Electrical Engineering and Information Systems

## Development of novel nano-probing technologies and nano-scale characterization of nano-materials for future device application

We aim at investigating electronic and optical properties in various nano-materials by means of nano-probe methods such as scanning tunneling microscopy (STM), atomic force microscopy (AFM) and related ones.

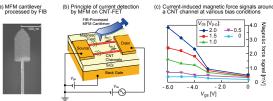
- ◆ Characterization of Solar Cell Materials
  - Photovoltaic properties and minority carrier dynamics
  - · Photothermal spectroscopy by AFM



Topography, surface potential in darkness and photothermal signals on multicrystalline Si solar cell

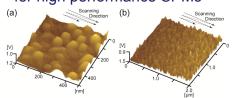
- ◆ Characterization of Carbon Nanotube FETs
  - · Current detection

by magnetic force microscopy (MFM)



Channel properties in CNT-FET examined by current-induced magnetic force measurements by MFM

- ◆ Development of Novel SPM Methods
  - · Fast imaging in AFM
  - Novel operation methods for high performance SPMs



Topographic images of InAs quantum dots observed by fast mode AFM

- ♦ Physics in Quantum Nanostructure
  - Observation of physical phenomena in low-dimensional semiconductors

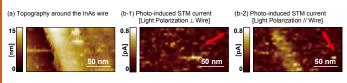
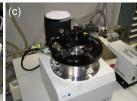


Photo-induced current signals on InAs wire structures observed by STM under light illumination









Tunable Ti:Al<sub>2</sub>O<sub>3</sub> laser with solid state green laser



Variable temperature SPM in ultra-high vacuum

Multi-functional SPM equipments:
(a) air type, (b)/(c) high vacuum and variable temperature type